

Applicants: Steven Say-kyoun Ow and Tae Jin Eom  
U.S.S.N. 09/121,152  
AMENDMENT ACCOMPANYING  
REQUEST FOR CONTINUED EXAMINATION

### In the Claims

Claims 1-20 (cancelled).

21. (previously presented) A method of de-inking waste printed paper, comprising

a) pulping at a pH of less than about 8 waste printed paper with an enzyme capable of dislodging ink particles from the waste printed paper in an aqueous medium at a pH between about 3 to less than 8, wherein ink is dislodged from the waste printed paper by action of the enzyme; and

b) removing the dislodged ink particles from the resulting pulp containing medium.

22. (Original) The method of Claim 21 wherein dislodged ink particles are removed by flotation.

23. (Original) The method of Claim 21 wherein dislodged ink particles are removed by washing.

24. (Original) The method of Claim 21 wherein the amount of enzyme used is in the range of about 0.005 to about 5 percent-by-weight based on the dry weight of the wastepaper.

25. (Original) The method of Claim 1, wherein said enzyme is selected from the class consisting of cellulases, hemicellulases, pectinases, other carbohydrases and mixtures thereof.

26. (Original) The method of Claim 21 wherein said enzyme is a cellulase selected from the group consisting of cellulases derived from *Trichoderma viride*, *Aspergillus niger* and mixtures thereof.

27. (Original) The method of Claim 21 wherein the pH of said aqueous medium is from about 3 to 7.

28. (Original) The method of Claim 21 wherein the pulping occurs at a consistency of pulp of about 12% or greater.

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29. (Original) The method of Claim 21 wherein the pulping occurs for a period of less than about 1 hour.

30. (Original) The method of Claim 1 wherein the temperature of the pulping is in a range of from about 20°C up to about 60°C.

31. (previously presented) A method of recycling waste printed paper, comprising:

a) pulping waste printed paper;

b) contacting at a pH between about 3 to less than 8 waste printed paper with an enzyme capable of dislodging ink particles from the waste printed paper in an aqueous medium at a pH between about 3 to less than 8, wherein ink is dislodged from the waste printed paper by action of the enzyme; and

c) removing dislodged ink particles from the resulting pulp containing medium.

32. (previously presented) The method of Claim 31, wherein the enzyme is a cellulase selected from the group of cellulases derived from *Trichoderma viride*, *Aspergillus niger* or mixtures thereof wherein the cellulase is used in an amount between about 0.005 and about 5.0 percent-by-weight based on the dry weight of the waste printed paper, the contacting being carried out at a temperature between about 20°C and about 60°C.

33. (Original) The method of Claim 31 wherein the amount of enzyme used is in the range of about 0.005 to about 5 percent-by-weight based on the dry weight of the wastepaper.

34. (Original) The method of Claim 31 wherein said enzyme is selected from the class consisting of cellulase, hemicellulase, pectinase, other carbohydrases and mixtures thereof.

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35. (Original) The method of Claim 31 wherein said enzyme is a cellulase selected from the group consisting of cellulases derived from *Trichoderma viride*, *Aspergillus niger* and mixtures thereof.
36. (Original) The method of Claim 31 wherein the in particles are removed by flotation or washing.
37. (Original) The method of Claim 31 wherein the pH of said aqueous medium is from about 3 to about 7.
38. (Original) The method of Claim 31 wherein the pulping occurs at a consistency of pulp of about 12% or greater.
39. (Original) The method of Claim 31 wherein the pulping occurs for a period of less than 1 about hour.
40. (Original) The method of Claim 31 wherein the temperature of the pulping is in a range of from about 20°C up to about 60°C.
41. (previously presented) A method of biologically de-inking waste printed paper comprising:
- a) pulping at an acidic or neutral pH the waste printed paper with an enzyme capable of dislodging ink particles from the waste printed paper in an aqueous medium at an acidic range or neutral range pH, wherein ink is dislodged from the waste printed paper by action of the enzyme; and
  - b) removing dislodged ink particles from the resulting pulp containing medium.

Please add the following new claims.

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42. (new) The method of claim 31 wherein the enzyme enhances removal of materials selected from the group consisting of heavily coated inks, highly polymerized inks, non-impact inks, and cured polymer resins.

43. (new) The method of claim 42 wherein the enzyme is effective to enhance removal of cured polymer resins.

44. (new) The method of claim 31 wherein the enzyme is effective to debond fiber bonding.

45. (new) The method of claim 25 wherein the enzyme degrades by enzymatic hydrolysis.

46. (new) The method of claim 31 wherein the enzyme degrades by enzymatic hydrolysis

47. (new) The method of claim 41 wherein the enzyme degrades by enzymatic hydrolysis